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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE•

OCTOBER 27, 1934

Soviet Spectacle

See Page 266

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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DO YOU KNOW?

The world's champion watermelon weighed 175 pounds.

Italian asphalt is to be exploited as a raw material for liquid fuel.

Bakeries first began using brewers' yeast in the nineteenth century.

It is rare for lightning to leave a conspicuous mark on the earth.

Egypt had 350 pharaohs in her long history, but some ruled sections of the country jointly.

Air-conditioning equipment is to be provided for three new streamlined western trains.

After three years' research, a successful commercial all-metal butter churn has been announced.

Andrew Jackson's home, the Hermitage, famous for its beautiful trees, has 28 kinds of trees on the lawn.

The "Radio Amateur's Handbook" has been published in raised Braille type for the blind by the American Radio Relay League, so that more blind people may become amateur radio operators.

The island of Capri, off the coast of Italy, has been made a bird refuge.

Norwegian experiments show that if hay is dried rapidly, it retains best the Vitamins A and D, needed by cattle.

In 1761, the British Museum permitted only 15 persons at a time to visit the exhibits and they could stay only two hours.

Throwing a temporary bridge across the swift Columbia River in 14 days is one of the tasks set for contractors at the Grand Coulee dam.

Pneumatic tires were invented in 1889 by an Irish physician who wanted to make a long bicycle ride to school more comfortable for his young son.

In the eighteenth century cancer was ignorantly regarded as contagious and sufferers from the disease were subjected to needless neglect and cruelty.

An expedition is heading for eastern Tibet to collect the snow leopard, wild horse and other Tibetan animals for habitat groups to be exhibited by the Academy of Natural Sciences of Philadelphia.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY

How long do fingerprints lasts? p. 260.

ASTRONOMY

Why do astronomers hold out the possibility of brilliant Leonids this year? p. 262. *Our Stone-pelted Planet—H. H. Nininger—Houghton-Mifflin,* 1933, $3.

What is the brightest star now in the northern half of the sky? p. 263. *Field Book of the Skies—W. T. Olcott and E. W. Putnam—Putnam's,* 1929, $3.50.

Where will the 200-inch telescope be erected? p. 265.

CHEMISTRY

What two elements compose the new "super caustic"? p. 259.

What heavy elements are now used in industry? p. 267.

How can the chemist aid in crime detection? p. 267.

ETHNOLOGY

Whence came Hallowe'en? p. 270.

EUGENICS

What precautions should be taken by cousins who wish to marry? p. 264. *Genetic Principles in Medicine and Social Science—Lancelot Hogben—Knopf,* 1932, $3.75.

MEDICINE

How does evipan differ from ether? p. 260.

Why may anesthetic research add to knowledge about life and death? p. 268.

NUTRITION

What is the new way of preparing vegetables for babies? p. 264.

What part of bread is least digestible? p. 265.

PHYSICS

What radioactive substance produces the most penetrating artificial gamma rays? p. 259.

PHYSIOLOGY

How are sex, cancer, vitamins and virus diseases related? p. 266.

PUBLIC HEALTH

How is malaria combatted in Panama? p. 265.

SURGERY

Can grafting the cornea restore sight? p. 261.

How are cow's horns used in surgery? p. 264.

These curiosity arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

PHYSICS—MEDICINE

Most Penetrating Artificial Gamma Rays From Sodium

Radiation Expected to Have Great Usefulness In Treatment of Cancer and Medical Research

DISCOVERY of a way to make the common element sodium give out the world's most penetrating gamma rays by artificial means was announced at the University of California. The radiation, it is believed, will have great usefulness in medicine for the treatment of diseases like cancer and in a study of how radiation acts on living tissue.

Prof. Ernest O. Lawrence who made the discovery declared: (*Physical Review, October* 20) "In the biological field radio-sodium has interesting possibilities that hardly need be emphasized here."

Sodium is one of the constituents of familiar table salt and occurs in certain of the fluids of the human body. Saline solution, for example, can be injected into the blood stream of the human body without disastrous effects.

The new gamma radiation produced in Prof. Lawrence's laboratory from sodium is more penetrating than any ever before obtained. Sodium gamma rays have energies of 5,500,000 electron volts. Most penetrating of the naturally produced gamma rays are those of thorium C" (thorium C double prime) having energies corresponding to only 2,600,000 volts.

Most powerful and penetrating of the hitherto man-made gamma rays are those created by Drs. C. C. Lauritsen and H. R. Crane of California Institute of Technology from carbon. The carbon gamma rays had energies of 3,500,000 volts. Prof. Lawrence's radiation, therefore, exceeds the previous records for gamma rays produced both naturally and artificially.

More important still, from the standpoint of possible medical use as in cancer therapy, the radio-sodium gives out its rays for a long time. The half life of the substance is 15 hours, that is, the original amount disintegrates to half in this time. Most of the elements with which artificial radioactivity has been produced do not last nearly as long. Two hours has been a long time hitherto; a few minutes of activity was the general rule.

Prof. Lawrence creates his artificially radioactive sodium by bombarding sodium with deutons, the charged nuclei of the new, heavy hydrogen. These deutons are shot at the sodium with energies of 1,750,000 electron volts.

Besides the very penetrating gamma rays, beta rays or electrons come off from the radio-sodium. This happening indicates, Prof. Lawrence suggests, that the radioactive substance is a form of sodium which disintegrates into magnesium. Chemical tests confirmed this suspicion, he declares.

The way gamma rays from sodium are absorbed in lead suggest the radiation emitted is probably all of one wavelength, or monochromatic. This finding will make the new radiation extremely useful in physical experiments.

"It perhaps should be mentioned," declares Prof. Lawrence, "that many uses of radio-sodium will probably be found. In the physical laboratory it provides a presumably monochromatic source of high energy gamma-radiation of great intensity. In the biological field radio-sodium has interesting possibilities that hardly need be emphasized here."

Science News Letter, October 27, 1934

WATER BOY

"Where did you come from, water boy?" This is the question that Mexican archaeologists would like to ask this image that they unearthed from Tomb Number 50, at the ruined city of Monte Alban. Where Indians of the prehistoric mountain city got water to drink is a mystery, considering that the mountain ridge today is quite lacking in springs or streams. The sturdy little Indian with the heavy jar strapped to his head looks as if he might speak any minute, to tell whether he brought his load from a near-by source, since dried, or whether the Monte Albanians had to haul their water supplies a long way. The statue, which stands about 18 inches high, lay in a jumbled pile of clay gods, food dishes, and incense burners in the tomb.

CHEMISTRY

"Super Caustic" Stronger Than Lye Now Available

ENTER sodium monoxide, new superchemical of American industry. Experts of the Niagara district, long accustomed to wresting queer substances from common minerals by the aid of electricity, now offer one of the most powerful forms of soda known to science.

Sodium monoxide, rarely prepared as an academic curiosity by a few inquisitive professors, proves to be readily available as an intermediate in peroxide manufacture. Known also simply as sodium oxide, it is described as a "super-caustic" which exceeds even caustic lye in chemical vigor. In the form of a dry powder it acts first as a powerful desiccant, or artificial drying agent. It virtually tears water out of most organic matter, and is thereby transformed into highly concentrated lye, or sodium hydroxide. This de-watering process is attended with production of heat. As a result the normal action of the lye is accentuated, and speedy chemical action assured.

(*Turn to Page* 260)

In the manufacture of the new product metallic sodium, a well-known eletrochemical material, is permitted to combine with oxygen in a restrained fashion, yielding a compound somewhat analogous to the rust of iron, but much more active chemically. Great care has to be taken not to allow too concentrated a supply of oxygen to reach the sodium. Even common air, containing scarcely 21 per cent. of oxygen, is too rich in its undiluted state. The formation of peroxide, usually resulting in such a process, is avoided.

In view of the ability of the new oxide to attack not only common vegetable and animal matter, but metals, solvents, and a host of organic chemicals related to the dye, lacquer, drug and other industries, especially when in the molten state, a wide interest is being taken in its industrial future.

Science News Letter, October 27, 1934

MEDICINE

New Anesthetic, Evipan, May Be Useful in Childbirth

A WHITE crystalline tasteless powder which puts the patient to sleep in a minute or even less time is one of the new substances discovered in the search for the perfect anesthetic. It is called evipan in Europe and evipal in this country.

It was devised by German scientists. How well it has worked in actual practice was reported to the Congress of Anesthetists by Dr. Hans Widenhorn of the University of Freiburg, Germany, and Drs. Ronald Jarman and A. Lawrence Abel of the Woolwich War Memorial Hospital, England. In the form of a clear solution in water, evipan is injected into a vein and the patient goes quickly and quietly to sleep. There is none of the excitement and nervousness at the beginning of the anesthesia, or the vomiting and nausea afterwards that occur with some other anesthetics such as ether.

The patient awakens quickly from evipan anesthesia which usually lasts for about twenty minutes. When it is necessary to prolong the anesthetic period, Dr. Widenhorn augments the effect of evipan with ether or nitrous oxide. Drs. Jarman and Abel prolonged its effect by repeating the dose.

Evipan is not excreted from the body by passing into the air through the lungs, like ether, but by chemical breakdown in which the liver plays an important part. For this reason evipan is particularly useful for operations on patients suffering from lung disease but should not be used on patients suffering from liver or gall bladder disease. It may also be used in childbirth since with it "something similar to twilight sleep may be obtained," according to Dr. Widenhorn.

Science News Letter, October 27, 1934

MEDICINE

Childless Couple's Chance For Family Now Doubled

WOMEN who seek medical aid to overcome involuntary childlessness now have double the chance of realizing their natural dream of bearing children of their own, it appears from results obtained at the Evans Memorial Institute, Massachusetts Memorial Hospitals.

The secret of success in bringing the boon of children to previously childless couples lies in recognition of the fact that childlessness may be due to multiple causes operating in both partners to the childless marriage, Dr. Allan Winter Rowe, director of the institute, told members of the American College of Surgeons at one of the "show me" clinics of their congress.

Fifty out of one hundred couples were helped to have children of their own by Dr. Rowe and his colleagues. Reports in medical literature show that the best results previously obtained have enabled only twenty-five out of every hundred couples to achieve parenthood. Working with Dr. Rowe in his efforts to overcome involuntary infertility were Dr. Samuel R. Meaker, Dr. Samuel N. Vose and Dr. Charles H. Lawrence.

The first step in the proceedings to help the childless couples was a thorough study of the histories and physical condition of both husband and wife. These studies and examinations showed that both the men and the women were suffering from a number of constitutional and glandular abnormalities. Disorders in varying degrees in both men and women were found in thyroid, pituitary and sex gland functions. Anemia, over- and underweight, depressed energy metabolism, low blood pressure, signs of liver injury indicating toxic conditions, and venereal, tuberculous and other infections were found in both men and women.

Only nine of the men and three of the women were adjudged normal. With some exceptions, no one of the abnormalities found would by itself have prevented the couple from having children, Dr. Rowe explained. But the combination of several of the abnormalities in both partners to the marriage were in his opinion sufficient to cause the childlessness. In order to raise the chance of the couple for having children to its very highest, all the abnormal conditions had to be corrected. The constitutional factors such as anemia, focal infections, depressed energy metabolism, malnutrition and disordered liver function played a major role in contributing to the childlessness, he believes.

Success in "doubling the batting average" of involuntarily childless couples resulted from discovering and correcting all the abnormalities.

Science News Letter, October 27, 193

ARCHAEOLOGY

Fingerprints on Pottery Aid in Tracing Past

FINGERPRINT science has come to the aid of archaeologists exploring the ruins of Bible cities. Fingerprints of potters who worked in a Bible town in Palestine have been found impressed in some of their work so plainly that earthen dishes which they made can be sorted out 2,000 to 3,000 years later.

This detective work has been done by Dr. William F. Bade, professor of Semitic literature and languages at the Pacific School of Religion and director

of the Palestine Institute of the Tell en-Nasbeh expedition.

In his laboratory in Berkeley, California, Dr. Bade has been studying pottery jars and fragments which he and his assistants have accumulated in four expeditions to Tell en-Nasbeh, believed to be the site of the Bible city of Mizpah. Mizpah is famous as a city where Samuel judged the forces of the Israelites and where Saul was chosen king.

Debris in the ancient town lies in layers, buried by successive builders who filled in depressions, leveled off ruins, and built their new streets and houses over remains of the previous town. Because this filling in process was often uneven, archaeologists have trouble, Dr. Bade explains, in tracing the same layer of occupation over a 12-acre site, such as Mizpah covers.

Fingerprints have helped solve this problem at Mizpah. Clay jars found in different depths of the mound have proved to be from the hand of the same potter, thus showing that the jars and objects associated with them belonged to a single period of the town's history.

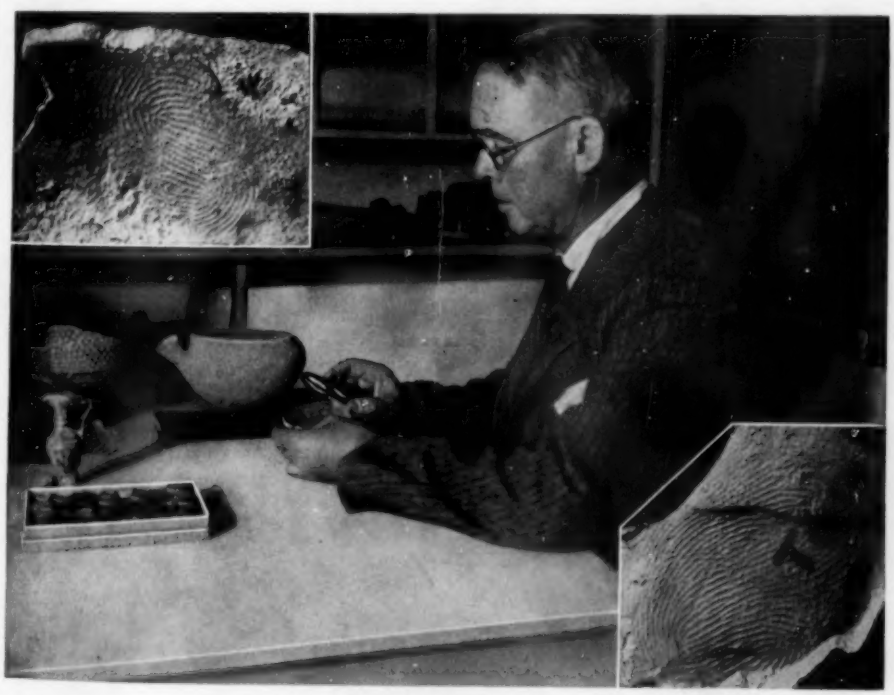
On large, two-handled jars, the potters of Mizpah stamped trade-marks—their own fingerprints, Dr. Bade discovered. This was done apparently to enable them to recognize their own craftwork.

"It is in rare cases possible to make out the lines of the sweat ducts," he explains, and in that case they can be identified by making models of the deep impressions and fitting them to similar prints in other jars.

"I do not for a moment believe that the potters were aware that their fingerprints had the distinctiveness which is now recognized in the fingerprint system. It is the place and arrangement of the impressions which served as distinguishing marks to them."

In his study of fingerprints, Dr. Bade was assisted by August Vollmer, professor of police administration at the University of California and former Berkeley police chief.

Science News Letter, October 27, 1934



FINGERPRINTS 2000 YEARS OLD

The long arm of archaeological science has reached back 2,000 years and more to identify Bible potters who left fingerprints in their clay wares. Dr. Bade is shown examining pottery which he unearthed at ruins of Mizpah. The prints shown are of the finger of the same person impressed on lamps in a tomb at Mizpah dating from about the beginning of the Christian era.

SURGERY

Sight Restored by Corneas Grafted on Both Eyes

THE ONLY person in the world who has had new corneas successfully grafted onto both eyes attended the meeting of the American College of Surgeons as an unofficial exhibit of British surgical skill. She is Miss Daphne Muir, English novelist, who lost her sight when both corneas were injured in an accident some years ago.

The cornea is not the eye lens, but is a transparent tissue in front of the lens corresponding to the front lens of the camera. Numerous cases have been reported of successful grafting of a new cornea onto one eye but this is said to be the first successful case of double cornea transplant.

The operation was performed by Dr. Tudor Thomas of Cardiff and London. Dr. Thomas was not present at the meeting and Miss Muir was not on the official program. However, she was there on a visit in another English surgeon's party and consented to be the subject of a demonstration for American doctors specially interested in surgery of the eye.

Miss Muir's vision is not perfect but she can read headlines in newspapers, can read her own correspondence, and can safely go about the familiar streets of her home town and attend to her shopping. The first object shown to her after the operation was the title on the cover of her just-published novel which was, appropriately enough, "Very Heaven."

New Pressure Technic

The new corneas, taken from eyes which had to be removed from patients suffering from other conditions, were attached by a new technic for this operation. Instead of stitching the new corneas directly to the underlying tissue on Miss Muir's eyes, Dr. Thomas held them in place with two strands of surgical silk applied something like a cross-stitch in embroidery. After carefully removing the injured cornea from Miss Muir's eye, he placed four stitches in diagonally opposite pairs, the silk between each pair crossing to form a large X. The new, transparent cornea was slipped under and the ends of the X or cross-stitch were drawn tight and this held the new tissue in place. The method is called the pressure technic of grafting.

Science News Letter, October 27, 1934

ASTRONOMY

Watch For the Leonids

Astronomers Are Making No Promises, But if Events Of 33 Years Ago are Repeated You May See Hundreds

By JAMES STOKLEY

THE LEONID shower of meteors, or shooting stars, is one of the principal events on the celestial program for November, but the astronomers who specialize in the study of these bodies are properly very cautious about making any definite promises as to what may happen on the night of November 16, when most are apt to be seen. This is the way the matter stands. In 1799, 1833 and 1866, brilliant showers of these meteors were seen in November, thousands an hour. In November of other years a few were seen, all seeming to radiate out of the constellation of Leo, the lion, which rises in the northeast this month about midnight.

From these observations, astronomers came to the conclusion, now universally accepted, that there is a vast swarm of these tiny bodies, which are not stars at all, but bits of cosmic dust and other debris left over from the formation of the solar system, or perhaps the remains of a comet. This swarm is shaped like a ring, pulled out into an ellipse, and surrounds the sun, approaching closer at one point than at another. This ring crosses the earth's orbit at the point that our planet occupies in mid-November, so that every year we encounter some of the meteors.

Not Uniform

But they are not uniformly distributed around the ring. At one place they are much more concentrated, and this cluster takes about 33 years to travel once around the circuit. In 1799, 1833 and 1866 the earth encountered the large swarm, and a fine display of celestial fireworks was the result. Consequently it was expected that 1899 would bring a return engagement. This, however, did not come true, and in November of 1899 and 1900 there were fewer meteors than in November of an ordinary year, when a shower was not expected. It was shown later that this was because of the gravitational pull of the giant planet Jupiter. This body had passed close to the center of the swarm a few years earlier, and had pulled them aside, so that they missed the earth.

Last year it was time for them again. There was some reason for supposing that in the intervening third of a century, Jupiter might have repaired its damage, by switching the swarm back again into its old orbit, and so astronomers watched, and waited. In 1930 and 1931 there had been fairly good displays. The year 1932 had not been so promising, but it was good enough to keep up hopes. But last year was a disappointment, very much like 1900.

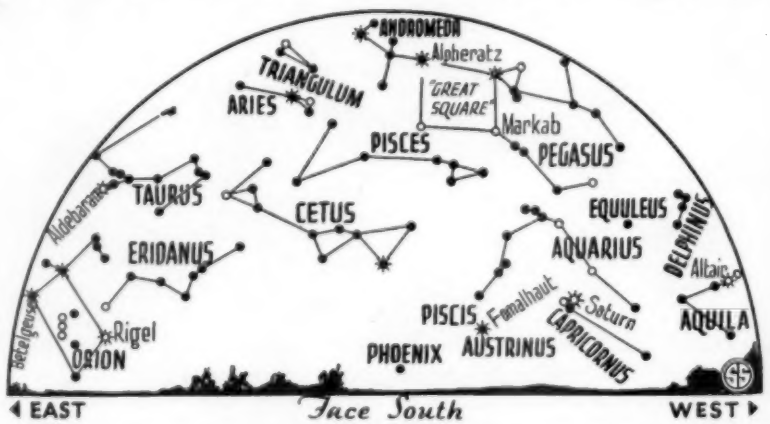
Unusual Display?

With this history, you may wonder why anyone should expect any kind of a display in 1934. The reason is that the unfortunate years of 1899 and 1900 were preceded by fairly good showers in 1898, and followed by a good one in 1901, even though they came nowhere near the great shower of 1833. It seemed as if Jupiter had only switched aside the center part of the great swarm, and that the very first section of it, and the stragglers at the end, had continued in their former courses. Thus, if the events of 33 years ago are repeated, this November may bring quite a good shower.

Unfortunately, meteor observation is a sport that requires late hours. The earth turns on its axis in the same direction — counter clockwise, as seen from a point high above the north pole —as it turns around the sun. When it is between sunset and midnight we are on the rear quarter of the earth, and those meteors that we see then have to catch up to us. Between midnight and sunrise we are on the advancing section of the earth, and then we meet the meteors head on. In just the same way, when walking along a crowded street, you pass more people going the opposite way than going your way, because all the latter are travelling along with you.

So, if you want to see some of these meteors, get up for a little while in the early morning hours of Thursday, November 15, Friday the 16th and Saturday the 17th, and look to the northeastern sky. There you will see the constellation of Leo, in which is the familiar group of stars called the sickle, from the center of which the Leonid meteors seem to radiate. On an ordinary night you might see two or three meteors each hour, but on these nights, particularly the second, you should see many hundred in the same time. Of course, it is better if you can get away from the city, where the dust and glare prevent your seeing the fainter ones. The moon is at first quarter on the evening of the 13th, so it will set soon after midnight on the meteor nights.

✲ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



ON HIS BACK

Lying low in the eastern evening heavens is the famous warrior Orion with the three stars in a vertical row forming his belt.

BRIGHTEST IN NORTHERN SKY

You can easily locate the beautiful Vega in Lyra, the lyre, and above her Deneb, marking the top of the Northern Cross.

and its glare will not be disturbing. If you want to make some scientific observations, count the total number of meteors that you see during each half hour period, and send records, together with notes of any particularly interesting features, to Dr. Charles P. Oliver, at the University of Pennsylvania's Flower Observatory, Upper Darby, Pa. As president of the American Meteor Society, a nation-wide group of amateurs, Dr. Olivier is particularly interested in gathering such data.

Out of Leo

The reason that the meteors all seem to radiate out of Leo, from whence comes their name, is that they are moving around the sun in parallel paths, and enter the earth's atmosphere the same way. These paths seem to converge in the distance, like the tracks of a railroad. Their orbits correspond very closely with the orbit of Tempel's comet, which has not been seen for many years. It is supposed that the meteors are the remains of the comet.

While you are up in the early morning, you will be able to see the red planet Mars, also in Leo, to the east of Regulus, the star at the end of the sickle's handle. It rises soon after one o'clock. Perhaps you can also, towards the end of the month, see Jupiter low in the eastern sky before sunrise.

On November 20 the moon hides, or "occults," several of the brighter stars in the Pleiades, the little cluster in the constellation of Taurus. This happens in the evening and early morning, and would be a most interesting spectacle were it not for the fact that the moon is then almost exactly full. Because of the glare it will be rather difficult to see these faint stars, except with telescopic aid. The moon passes Saturn on the night of November 14, so on that evening the two bodies will be seen close together in the southern sky.

In November, Orion, the mighty warrior of the sky, again appears in the evening. This constellation, most brilliant in the sky, can be seen low in the east, as shown on the accompanying maps. These show the appearance of the heavens at 10 p. m. on November 1, 9 p. m. on November 15 and 8 p. m. on November 30. The warrior is on his back. The three stars forming his belt are in a vertical row. Betelgeuse, to the north, rather reddish in color, marks one of his shoulders, and Bellatrix, above and farther south, the other. Rigel, brilliant star to the south of the belt, is in one of his feet.

The old star maps represented Orion as defending himself from charging Taurus, the bull, which can now be seen above him. Almost directly over Bellatrix, not quite as far as the distance between Betelgeuse and Rigel, is a star distinctly ruddy in color. This is Aldebaran, marking the Bull's eye, and it is in a V-shaped group of fainter stars, called the Hyades, that outline the animal's face. Still higher is a little cluster of faint stars, the Pleiades, famous "seven sisters" of mythology.

Sky Twins

Low in the northeast you can see the twins, Gemini, with the more brilliant Pollux below, and Castor, his brother, above. Over them, about half way to the zenith, is Capella, in Auriga, the charioteer. The Great Dipper, this month, is seen near the horizon in the north, as low as it ever gets. The two pointers, the stars in the bowl farthest from the handle, indicate the direction of the pole-star above. Higher than the pole-star, about as far above it as the handle of the dipper is below, is Cassiopeia, the queen, seated on her throne.

South of this lady, and directly overhead, is her daughter, Andromeda. This figure extends to the northeastern corner of a square of fairly bright stars, seen high in the south, and called the great square in Pegasus, because the other four stars are in that constellation, representing a winged horse.

Saturn In Southwest

In the southwest this month can be seen the planet Saturn, distinguishable from the stars by its brilliance greater than any of the nearby stars. Left of Saturn appears Fomalhaut, brightest star in Piscis Austrinus, the southern fish. Directly west shines Altair, in Aquila, the eagle. Altair can be recognized because it is attended on either side by a fainter star.

In the northwest shines the brightest star to be seen in the northern half of the sky, Vega, in Lyra, the lyre, and above it is Deneb, in Cygnus, the swan. This group is sometimes called the Northern Cross, Deneb marking the top of the cross, which is now standing in an erect position.

The moon is new on November 6 at 11:44 p. m., E. S. T., at first quarter on November 13 at 9:30 p. m., full on November 20 at 11:26 p. m., and at last quarter on November 29 at 12:39 a. m. It is at perigee (nearest earth) on November 12, 9:00 a. m., 229,750 miles distant, and at apogee (farthest from earth) on November 27, at 9:00 a. m., 251,380 miles distant.

Science News Letter, October 27, 1934

ZOOLOGY

Tuberculosis Found In Wild Moose

A RARE case of animal tuberculosis was found at Balaryd, in the Swedish province of Smaland, where a wild moose was recently ordered killed by the local sheriff. The animal, looking weak and emaciated, had repeatedly come out of the forest and kept close to a gang of workmen building a road. One day the moose lay down on the road, and was unable to rise again. It was then shot. The carcass was examined and it was found that the animal suffered from tuberculosis in a very advanced stage.

Science News Letter, October 27, 1934

NUTRITION

Young Infants May Be Fed Vegetables By New Method

A NEW method of preparing vegetables for feeding to babies as young as three months of age has been tested clinically by a New York physician, and it now appears that mothers may soon be having vegetable formulas for infants as well as the old accustomed milk formulas.

The tests with feeding green and yellow vegetables successfully to 70 infants between three months of age and one year were reported before the American Dietetic Association by Dr. George W. Caldwell of New York.

The method tested by Dr. Caldwell consists of homogenizing the vegetables. This process explodes particles of the food during its preparation so as to release nutritive elements and make the food easier to digest.

Babies observed by Dr. Caldwell were fed, not merely one homogenized vegetable, such as spinach or carrots, but a combination of several containing different vitamin and mineral elements.

The new method overcomes disadvantages of feeding vegetables to infants, he concluded from his observations. The babies gained normally in weight and tests of red blood cells and hemoglobin in their blood indicated that the iron and copper in the vegetables were advantageous.

Science News Letter, October 27, 1934

ETHNOLOGY

Ainu Women Wear Belts As Badges of Identity

AN AINU woman in northern Japan wears her badge of identity around her waist, and no man of her people is ever allowed to see it.

This discovery of secret girdles worn by women of the mysterious Ainu tribe is reported by a committee of the British Association for the Advancement of Science. Through his discovery of the secret girdles, Dr. N. G. Munro has obtained positive evidence that the Ainu people have a clan organization.

The Ainu of Yezo and other northern Japanese islands have been particularly elusive folk for scientific study. Their racial identity is obscure, as is their language. Their old culture now clashes with the Japanese culture, and the Ainu ways of living are passing.

An old man, an elder of the Ainu people, who had never seen one of the women's girdles, was able to tell Dr. Munro that the girdles have magic power, being the gift of a special spirit. In times of epidemic, fire, or tidal wave, the women would wave their girdles to restrain the evil powers.

By his medical treatment of children and urgent cases, Dr. Munro won the confidence of some Ainu women. Two girdles were actually shown him, and exact copies were made for him.

The important feature of the girdles is their length, Dr. Munro reported. Each Ainu woman cherishes the belief that the length of cord is a measure of identity given to a remote ancestress by a particular deity. By these genealogical belts, the Ainu are divided into clans.

Ainu custom forbade marriage between two persons, if the women of both families wore the same kind of secret girdle. The penalty for defying this prohibition was formerly death.

"Now, under Japanese law," Dr. Munro found, "marriages occasionally occur but are disapproved by relatives and members of the village and regarded as bringing ill-luck not only to the parties concerned but perhaps to the community."

Science News Letter, October 27, 1934

SURGERY

Surgeon Uses Cow's Horn In Treating Broken Bones

COW'S horns, prepared in the same way as the old fashioned powder horns which were used with muzzle loading firearms, are now being used to repair broken bones.

Advantages of this new device are that it is inexpensive and does not require elaborate machinery to apply it as do metal plates, Dr. Edson B. Fowler of Evanston, Ill., said. (*Illinois Medical Journal, September*)

It can be assembled for a few cents almost anywhere at any time and is so strong and flexible that a graft has never been known to break. Another advantage of the cow's horn results from its supply of cysteine, in Dr. Fowler's opinion. Cysteine stimulates growth of cells and so adds materially to the healing and union of fractured parts, he points out. He believes the cysteine in the horn is responsible in a large measure for its success in the healing of the injuries without complications and the short time required for the formation of callus at the joining of the bone.

Science News Letter, October 27, 1934

IN SCIENC

EUGENICS

Study Three Generations Before Marrying Cousin

EXAMINE carefully the family history on both sides for at least three generations before marrying your cousin, is the advice of present-day geneticists, according to Dr. Charles B. Davenport of the department of genetics, Carnegie Institution of Washington.

Inbreeding is not in itself the cause of defective traits, it appears from statements on the subject made by Dr. Davenport. Through inbreeding, however, existing traits, either good or bad, are strengthened.

Traces of muscular abnormality, dwarfism, epilepsy, feeblemindedness and insanity are the conditions to be carefully looked for in the three-generation history of both cousins. If persons in either direct or collateral lines within the three generations are found having any of these defects, the marriage between the cousins is hazardous for the offspring, Dr. Davenport pointed out.

Science News Letter, October 27, 1934

PHOTOGRAPHY

Long-Range Camera Uses Mirrors Instead of Lens

A TELEPHOTO camera, adapted for either motion or still photography, using a short reflecting telescope instead of the customary combination of refracting lenses, is described in *Die Umschau*, Sept. 16, by an author who signs himself, merely "Th.M."

In a reflecting telescope a pair of mirrors is used instead of the conventional lenses, for the purpose of focusing the image on the camera film or the observer's eye. At least one of the mirrors must be concave or saucer-shaped, to bend the light rays aside and bring them to a point or focus. In the new German camera both mirrors are concave, increasing the magnifying power for a given length of tube.

A further advantage claimed for the new machine is light weight in proportion to the magnifying power.

Science News Letter, October 27, 1934

ENCE FIELDS

NUTRITION

Least Digestible Part Of Bread Is the Crust

CHILDREN who do not like the crusts of bread will rejoice in the finding of University of California scientists that the crust is the least digestible part of the loaf.

The portions of the bread dough most exposed to direct oven temperature are least digestible, Drs. Ethelyn O. Greaves and Agnes Fay Morgan of the department of household science found in an investigation. The most digestible portion of the bread is the "crumb" while the lower crust is less digestible and the top crust least digestible of all.

Parents, however, may still insist on crust-eating on economic grounds, it appears, since the California investigators state that crust is "good for you" in the sense that it is better than no bread at all. But the "crumb" is still better as regards digestibility as well as palatability.

Science News Letter, October 27, 1934

ASTRONOMY

Palomar Mountain Attains Fame as Telescope Home

AN UNSUNG California mountain top is about to become famous. It is Palomar Mountain, northeastward 45 miles from San Diego, elevation 6,126 feet above sea level.

Upon it will be erected the world's greatest telescope, now building slowly and carefully in Pasadena, Calif., and Corning, N. Y. Its diameter will be 200 inches, quadrupling the area of the present world's largest, the Carnegie Institution's 100-inch telescope on Mt. Wilson overlooking Los Angeles.

Not unlike many flat-topped California hills is Palomar, perch for the world's biggest eye. But for five long years, while other scientists have been designing and making ready to build the great telescope, observers have been making tests by eye and with photoelectric cells, of what the astronomers call "seeing" from the peak of Palomar.

Not merely height, not merely clear atmosphere or transparent air, not even complete clearness of the sky, but "good seeing" is necessary if the great telescope, costing millions of dollars, is to do its task of probing space with the greatest efficiency.

"Poor seeing" is caused by the bending of light as it passes through the atmosphere. The twinkling of stars when seen with the naked eye is an example. Masses of air of different temperatures or densities pass between observers and star and the star light is reflected by different amounts. An extreme case is heated air on a summer day causing grotesque distortions of distant objects.

The tests show that Palomar has exceptional seeing qualities and that it is free from troublesome city lights which often interfere with "seeing" on Mt. Wilson.

So the California Institute of Technology which will mother the great telescope with the aid of San Diego County is arranging to acquire Palomar Mountain. Soon a cluster of buildings will appear and some years hence the world's greatest spyglass will be directed at the heavens.

Science News Letter, October 27, 1934

MEDICINE

Infection After Operation Fought By New Method

A NEW way of fighting peritonitis, the often fatal infection which may follow abdominal operations, was demonstrated to surgeons attending the clinical congress of the American College of Surgeons by Dr. Edward L. Young, surgeon-in-chief of Faulkner Hospital and on the surgical staff of Massachusetts General Hospital. By this method death following surgical removal of part of the digestive tract was reduced from 30 per cent. to 2 per cent.

The method was originated by Dr. Herbert L. Johnson of West Roxbury and Boston. It consists of injecting into the abdomen what Dr. Young called a "concentracted fraction of bovine amniotic fluid." At first it was used at the time of operation but now is injected four to six hours before. This fluid, now obtained from cows at the time their calves are born, apparently has the power to stimulate healing in the abdomen and resistance to infection. Dr. Johnson first observed its effect in caesarean births and confined its use to these cases, obtaining the fluid from the patient.

Science News Letter, October 27, 1934

PUBLIC HEALTH

Fight Malaria By Treating People Instead of Insects

BY controlling the human element instead of the mosquito, the number of persons afflicted with malaria has been reduced in several Panama towns from 62 out of a 100 to only 8 out of 100.

This is the accomplishment of the past five years reported to the Gorgas Memorial Institute's board of directors by Dr. Herbert C. Clark, director of the institute's Panama laboratory.

Mosquito control by screening buildings and draining and oiling swamps and other breeding places of the malaria-carrying mosquito is the ideal method of fighting the disease, Dr. Clark emphasized. But it is very expensive and not suited to conditions in labor camps in the tropics.

So he and his associates have worked out an alternative method which consists in giving malaria treatment to all carriers of the disease as well as to persons actually sick with it. By thus eliminating the malaria parasite from the blood of persons living in tropical camps, the scientists can prevent the mosquito from picking it up and carrying it to a healthy person in the camp.

Atabrine is the medicine used in this work not because it is any better than quinine but because it is preferred by the people who have to take it.

Business firms can afford this method.

Science News Letter, October 27, 1934

PHYSIOLOGY

Ultraviolet Rays Destroy Snake Venom in Test Tube

ULTRAVIOLET rays of light will destroy the toxic poisons of deadly snakes like the cobra, copperhead and rattlesnake in a test tube, it was reported to the meeting of the Optical Society of America.

The long-held hope that a new way of combating the injurious effects of snake poisons on stricken victims of a bite is yet to be realized, however. Dr. David I. Macht, pharmacologist of Baltimore, who reported the research, indicated experiments with animals showed that no antidotal effect could be observed. Only when ultraviolet rays were focused on snake venom in an open wound was a beneficial therapeutic effect obtained.

Science News Letter, October 27, 1934

PHYSIOLOGY

Chemical Released by Nerve Carries Message to Muscle

A CHEMICAL released in certain nerves of the body every time a thought commands the nerve to move a muscle was described by Sir Henry Dale, director of Britain's National Institute for Medical Research. Sir Henry spoke at Indianapolis, Ind., at the dedication of Eli Lilly and Company's new research laboratories.

The message-carrying chemical is acetylcholine. Few people have ever heard of it. Yet it is the chemical that carries messages from some nerves to muscles. This performance was suggested by several researches in past years but the reality of the effect is only now being recognized. The theory contends that almost infinitesimal amounts of this chemical are released whenever there is a thought that commands a nerve to order a muscle to move.

Hundreds of times a second extremely small spurts of acetylcholine are produced in the body of an active person, each one bridging a gap from nerve to muscle.

It is hard to imagine the small amount of this chemical that is needed to act as chemical postman. Sir Henry computed that each outpouring spurt of acetylcholine consists of only three molecules. When he attempted to express its weight in grams, the scientific unit of weight that is one thirtieth of an ounce, he had to write twenty naughts to the right of a decimal point before a figure was reached.

If this chemical theory of how nerves control muscles really fits the facts, acetylcholine will be recognized as one of the most important substances in the living body, with possible potential usefulness in medicine.

Dr. Reid Hunt, of Harvard, was the first to point out the importance of acetylcholine about 20 years ago. Sir Henry Dale is one of the experimenters exploring the chemical mechanism of nerve action. He finds some nerves act by giving off acetylcholine while others act by giving off adrenalin.

Sex, cancer, vitamins and virus diseases were linked together by Sir Henry.

Scientists have discovered that the sunshine vitamin D, coal tar products causing skin cancer, and both the male and female sex hormones have a type of chemical structure which shows them to be in the same chemical family.

In fact, Sir Henry explained, large doses of one of these substances will often act like one of the others, as when vitamin D is given in excess to female rats with the result that their sexual activity is quickened.

Even more startling is the discovery that the coal tar substances causing tumors in chickens seem to set up a cancer disease that becomes an infection.

Dr. Peyton Rous of New York's Rockefeller Institute of Medical Research first found that this kind of cancer could be transmitted by injections of the fluid filtered from cancerous materials. Now it is found that cancer caused by a coal tar substance injected into muscles can be carried from chicken to chicken by the same method. This surprising fact seems to indicate that an infectious disease is created by a chemical substance acting in some way upon the living body.

Science News Letter, October 27, 1934

VITALISM
and
MECHANISM
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ASTRONOMY

Soviet Scientists Make Large Telescope Lens

See Front Cover

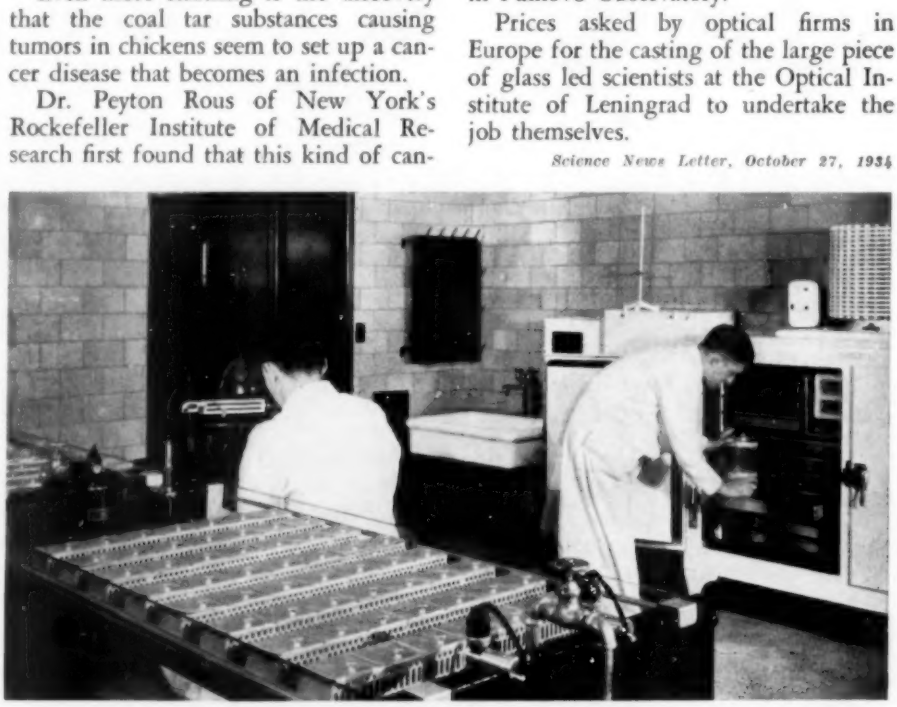
SCIENTISTS of Soviet Russia are entering the field of telescope lens construction. The cover illustration of SCIENCE NEWS LETTER this week shows a technician examining an 82 centimeter (nearly 33 inches) diameter lens.

Largest of the world's refractor telescopes is the 40-inch diameter lens instrument of Yerkes Observatory of the University of Chicago. The 33-inch lens of the Soviet scientists, therefore, is an understaking of the first magnitude.

Ultimate location of the lens will be in Pulkovo Observatory.

Prices asked by optical firms in Europe for the casting of the large piece of glass led scientists at the Optical Institute of Leningrad to undertake the job themselves.

Science News Letter, October 27, 1934



A YEAR'S SUPPLY OF FROGS

In the refrigerator in this sumptuous room of the new research laboratory building of Eli Lilly and Co., Indianapolis, recently dedicated, are hundreds of frogs kept in cold storage, at 4 degrees F. above freezing, until needed in testing digitalis. During the test each frog has his own individual cage (battery of cages in foreground) bathed in water of constant temperature. The strength of the digitalis is measured by its effect on the frog's heart.

CHEMISTRY

The Chemist Now Aids In Solving Crime Mysteries

TRACES of lead, benzene and gasolene found in the tissues of two dead men and the amount of salt in the left side of the heart of a body pulled out of the water—these results of chemical analyses enabled police to solve the mysteries of how the victims met their deaths, Dr. Alexander O. Gettler told members of the New York Electrical Society at their annual Science Forum.

Dr. Gettler is toxicologist to New York City, professor of chemistry at Washington Square College, New York University, and professor of toxicology in Bellevue Medical College.

Discovery by chemical tests of the lead, benzene and gasoline in the tissues of two dead men showed that they died accidental victims of their own attempt at arson. Dr. Gettler described the case and the chemist's role in its solution as follows:

"Two men were found dead in the cellar of a building. Investigation revealed that they had poured some volatile inflammable liquid over paper and wood intending to light same and put the building on fire. They noticed somebody on the street opposite this building and therefore they waited until this party walked away. While thus waiting, they inhaled the fumes of the liquid they had poured upon the materials in the cellar. They collapsed and died.

"By chemical analysis we isolated from their brains, lungs and livers some gasolene, some benzene and some lead. The explanation follows. The liquids which they poured upon the materials in the cellar were benzene and ethyl gas. The lead found in their tissues indicated that it was plain ethyl gas rather than ordinary gasolene."

Micro methods for isolating not only lead and benzene but ether, ethyl chloride, ethylene chloride, carbon tetrachloride and similar substances have been devised, Dr. Gettler said. These methods are valuable in detecting the cause of death since many people are killed each year by the inhalation of these anesthetics and cleaning fluids.

Explaining how chemistry can tell the police whether a dead man pulled from the water died by drowning or was killed and afterwards thrown into the water, Dr. Gettler said:

"The circulating blood of all people contains a definite amount of salt. Therefore, the salt content of the blood of the left heart chamber and the right heart chamber is the same. When people drown in salt water, the salt-containing water not only reaches the lungs but circulates as far as the left heart chamber and therefore increases the salt content of the blood therein. The person, however, dies long before the circulation may carry the salt water to the right heart chamber.

"Therefore in all salt water drownings the salt content of the left heart chamber is always much higher than that of the right heart chamber. In normal deaths, not drowning, the salt content of both heart chambers is the same.

"In fresh water drownings water only reaches the left heart chamber and therefore dilutes the salt content. In these fresh water drownings, therefore, the blood of the right heart chamber is always more in salt content than the left heart chamber."

He also described a method of determining alcohol in the human brain.

Science News Letter, October 27, 1934

CHEMISTRY

Thorium and Uranium Now Find Use in Industry

THORIUM and uranium, heavy elements continually breaking down in nature's process of radioactive disintegration, are now used by industry. New photoelectric cells for studying ultraviolet radiation in that region of light which produces sunburn employ uranium, while thorium is placed in many types of vacuum tubes. Both thorium and uranium are metals.

These little known practical applications of thorium and uranium were described before the meeting of the Electrochemical Society by J. W. Marden of the Westinghouse Lamp Company.

When a layer of thorium only a single atom thick is coated on a tungsten filament in a lamp, the lamp filament increases its emission of electrons. The electrons are electrical charges which constitute the current in radio vacuum tubes and X-ray tubes. Where an increased electron emission in a specific tube is desired the thorium coating is sometimes the answer to the problem.

Uranium, sensitive to light, is used in photoelectric cells where science needs an instrument to study the intensity of the invisible ultraviolet rays. By enclosing the uranium photocells in glass bulbs which cut off waves below a certain region of the spectrum, a selective apparatus is obtained useful in investigating the radiation which produces sunburn, or helps the body make its own vitamin D. Especially, reports Mr. Marden, are the new selective uranium photocells valuable in industries where ultraviolet light is used for irradiating food products to increase their vitamin D content.

Science News Letter, October 27, 1934

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MEDICINE

Study of Anesthetics Key To Mystery of Life and Death

Knowledge of What Happens To Cells of Body When Acted on By Ether or Chloroform Will Give New Light

THE MYSTERY of life and death may some day be solved by studies of the effect on body cells of the anesthetics now used to bring oblivion during surgical operations, it appears from the presidential address of Prof. William de B. MacNider, of the University of North Carolina, at the Congress of Anesthetists.

Scientists will come closer to understanding this fundamental problem when they learn more about how ether and chloroform and similar substances affect each kind of cell in the body, Prof. MacNider pointed out.

"We possess in the general anesthetics substances which, by their use and through an understanding of what they do and how they do it, come nearer than any other substances to an answer to the question, what constitutes life and what is the basis for a normal type of death dependent upon functional depression with or without structural changes," Prof. MacNider declared.

In order to pierce the mystery surrounding life and death, scientists need to discover first what happens chemically to the body cells when the patient is anesthetized, and then what happens chemically in reverse direction when the anesthetic wears off and the patient regains consciousness. Prof. MacNider described the anesthetic state as a period of depression in which the body cells in large measure are induced to suspend function.

Discoveries which may lead to a new conception of how the tissues of the body recover from injury and how as a result of that recovery they acquire resistance to further injury by the same or similar substances were reported by Prof. MacNider.

Prof. MacNider called attention to two earlier conceptions of how the body tissues recover from disease. One of these was formulated by the great Russian scientist, Metchnikov, who found that the action of certain wandering cells called endothelial leucocytes provided the body with a means of defense against invading cells like bacteria and also enabled the body to develop resistance to subsequent attacks from these cells. The second theory was a chemical one, formulated by the German bacteriologist, Paul Ehrlich, who found that tissues which were the seat of a disease process produced special chemical antibodies which neutralized or bound the poisons and in that way terminated certain diseases and imparted resistance to further attacks.

How Injuries Are Repaired

The part played by the fixed tissue cells of the body, such as are found in the skin, the eyes, the liver or the kidneys, in inducing resistance to disease has been investigated by Prof. MacNider. He found that in case of slight injury these cells repair themselves by formation of a normal type of cell having normal function but no resistance to the same kind of injury. But if the original injury is severe, in a certain number of instances the repair process results in formation of an abnormal type of cells, which may or may not have normal functional value. Such cells, however, are not only highly resistant to the chemical substance which caused the injury but to a variety of other chemical poisons.

Study of the role of the fixed tissue cells in giving the body resistance to injury by invading forces is just beginning, Prof. MacNider said. His investigations were made on the liver and kidneys. Their results and implications add further to the knowledge of how the body protects itself against injurious substances.

Science News Letter, October 27, 1934

SOLITUDE ISLAND

The true meaning of desolation was learned by these Soviet explorers at the roof of the world.

GEOGRAPHY

"Heroes of the Arctic" Thrilling Drama of North

IF American audiences have a chance to see the motion picture record of the Cheliuskin expedition, that thrilling episode in the conquest of the Soviet Arctic, they will witness a drama in which the plot was ordered by nature and circumstance, the actors are real history-makers, fighting for their lives and Soviet civilization, and cameramen had no opportunity for retakes.

At the American premiere of "Heroes of the Arctic" held at the Embassy of the Union of Soviet Socialist Republics, scientists and newspapermen had the privilege of seeing one of the most striking records of exploration ever placed on the screen. (*Turn to Page* 269)

Done with that mass technique peculiar to the art of the new Russia, from the crowds waving "bon voyage" to the greatly multiplied crowds cheering the return of Prof. Otto Yuelvitch Schmidt and his band of heroes, the film record produces a feeling that no Hollywood epic can achieve.

When the ice is seen crushing the side of the good ship *Cheliuskin,* when the bow of the ship in swirling snow upends and then sinks in the ice-covered Arctic ocean, 90 miles from land, leaving 104 men, women and children on the ice, when airplanes in the dead of Arctic winter rescue all safely, the audience seated in warmth and comfort nevertheless are eye-witnesses.

Fortunately, there is no attempt to convert into English the few speeches included. Superimposed titles give the essence, the original sound gives the spirit. It serves a real educational purpose to have Americans realize emotionally that Russian and other foreign languages are in everyday use in their countries.

Disaster so frequently makes news. The Cheliuskin film is remarkable because it has thrills aplenty although the life loss was only one during the whole expedition, a seaman who went down with the ship.

Even more thrilling to those who appreciate economic and geographical conquest is the broad plan for the opening of the long coastline of the Soviet Arctic to economic development and the opening of the Northeast Passage. Rich resources, lumber, oil, furs and minerals are locked by ice in the Soviet Arctic. The Cheliuskin expedition was but an incident in this great development which has made new gains this year.

Science News Letter, October 27, 1934

ASTRONOMY

See the Meteors in Comfort-- In German Planetarium

THOUGH astronomers may have to wait years before another bright naked-eye comet appears, visitors to the Zeiss planetarium in Jena, Germany, can now see one threading its way through the artificial skies. They can also see a brilliant shower of meteors, or "shooting stars" such as those observed in 1833, in 1866, and early this year from Little America.

The comet machine is a new attachment to the planetarium instrument which projects images of all the stars and planets, visible to the naked eye, on a hemispherical dome above. The comet shown is Donati's, which appeared in 1858, and of which George P. Bond of the Harvard College Observatory made a very complete and accurate series of drawings showing its appearance as it went across the sky. Reproductions of Bond's drawings are used like the separate pictures in a motion picture film, shown successively, and one faded into the next. At the same time, the comet projector turns so that the comet is seen to move through the starry background, from the constellation of Canes Venatici, the hunting dogs, southwards to Scorpius. It requires about five minutes for the comet to run its course, instead of the many weeks that it actually was visible.

The meteor shower projector throws on the dome rapidly moving spots of light, all radiating from a single point, in the same manner as a real one. This is accomplished by a set of rotating circular plates, cut with narrow slits. The method was devised by Dr. Philip Fox, director of the Adler Planetarium in Chicago. When watching it, the meteors seem to appear completely at random, except for the radiation from one point. In a real shower this effect of a radiant is due to the fact that the meteors are moving in parallel paths, and when they enter the earth's atmosphere, to be burned by the friction, their paths seem to converge in the distance, like the tracks of a railroad.

Another new planetarium attachment is a "mean sun projector." The real sun seems to move eastward completely around the sky during the year, but its actual speed varies. As a result, sun dial time is fast at certain parts of the year, and slow at others. Therefore astronomers assume the presence of a "mean sun," which also takes a year to encircle the sky, but moves with uniform speed eastward. Our standard time is based on the passage of this mean sun, sometimes ahead of the real one and sometimes behind.

The planetarium sun moves just like the real one but with the new device the position of the mean sun is also shown, by a line of light, and the visitor can see its motion.

There are now eighteen planetaria in Europe, and two in the United States—the Adler Planetarium in Chicago and the Fels Planetarium at The Franklin Institute in Philadelphia. Others are being built in Los Angeles and New York. Neither of the American planetaria is yet equipped with the new attachments.

Science News Letter, October 27, 1934

PHYSICS

Daily Cosmic Ray Variations Demonstrated

RESULTS of three years of research at the University at Innsbruck, Austria, reveal that there is a daily regular variation in the intensity of the cosmic rays striking the earth. Over 18,000 measurements have been made. The effect has been suspected but until now never proved conclusively.

Dr. Victor F. Hess, working with Drs. R. Steinmaurer and H. Graziadei of the University, will shortly announce to the Vienna Academy of Science that measurements in their cosmic ray meters indicate a daily fluctuation in intensity. The maximum occurs at midday, the minimum between 9 p. m. to 3 a. m. at night.

The cosmic ray station at Innsbruck has been taking cosmic ray measurements continuously since September 1, 1931. Some of the apparatus has never stopped during that time. The station is high in the Tyrol Mountains at an altitude of 2,300 meters above sea level, or well over 7,600 feet. The research program is part of the present world-wide plan to study cosmic rays.

In a preliminary announcement (*Forschungen und Fortschritte, Sept.* 1) Dr. Hess declared:

"It is not to be wondered at that for a shorter series of cosmic ray measurements at lower altitudes the daily change was not noted."

While avoiding a dogmatic assertion that the sun affects cosmic ray intensity, Dr. Hess suggests it would not be surprising if the changes in the magnetic and electric fields surrounding the earth—changing as they do from daytime to night—might alter the part of cosmic rays which is now known to consist of electrical particles.

Science News Letter, October 27, 1934

ETHNOLOGY

NATURE RAMBLINGS

by Frank Thone

Whence Hallowe'en?

AT LEAST three distinct major sources have contributed to the popular celebration of Hallowe'en: pagan European, Christian and American Indian.

Christianity contributed the name, but apparently very little else. Hallowe'en is a colloquial English contraction for All Hallow's Even, since the date is, according to the church calendar, the eve or vigil of the Feast of All Saints. Like all the vigils of the principal feasts, it is supposed by Church custom and rule to be observed as a day of fasting and spiritual preparation, rather than of merrymaking. Thus, formally at least, the Church turns her shoulder on Hallowe'en.

The general atmosphere of festivity, of minor license, of practical jokes, apparently traces back to the harvest-home festivals of the ancient pagan world, especially to the Roman Saturnalia. According to the Mediterranean mythology, the ancient reign of Saturn, father of the gods, was a golden age. Nobody had to work too hard, there were neither kings nor commons, masters nor slaves, and there were always plenty of good things to eat and wine to drink. Then Saturn was deposed by his son Jupiter, and the hard "modern" world began.

But once a year, when the harvest was safely in, a sunset reminiscence of Saturn's kindly rule was allowed to return to earth. There were feasts for the poor, and a night of liberty for the slaves. Nobody could be held accountable next day for anything that had happened the night before, so a good deal was likely to happen.

Farther north, in the Rhine country, an ancient race of gods, deposed to under-earth demonhood, returned to the summit of the mountain known as the Blocksberg, and there held revel. Thither their servants, the witches and warlocks, could also resort, riding through the air on broomsticks or black goats. With fiery faces they danced and reveled the night through.

Thinned down to mere folk-customs (though with a shuddery persisting belief in the actuality of witchcraft) fragments of these ancient pagan observances were transplanted to the New World by English, Dutch and German settlers. And as they adapted to their own everyday uses the things they found in the hands of the red-skinned natives, so they made use of them also in their celebration of the old transformed Saturnalia. What better basis for a fiery-headed spook than one of the Indians' pumpkins, hollowed out, endowed with whittled features, and fitted with a candle-end? What more available sleet-rattling missiles to fling at your neighbor's window than a handful of Indian corn? And what better nerve-steadier while you sat telling ghost stories than a pipeful of Indian tobacco?

Thus, with many accretions, has our popular autumn celebration come from many lands and grafted itself onto native roots here.

Science News Letter, October 27, 1934

ASTRONOMY

Perpetual Ice Age May Grip the Outer Planets

RIGIDLY gripped in the ice of a glacial age such as the earth has never known, the giant outer planets, Jupiter, Saturn, Uranus and Neptune may be rolling forever through space as enormous ice-covered balls.

This suggestion is made by Prof. R. Wildt, astronomer of Göttingen University in Germany (*Nature, Sept.* 15) Prof. Wildt has taken the known masses of the great planets, and by a mathematical parcelling-out has constructed hypothetical models of them that are in accordance with the widely accepted geochemical ideas of the well-known British scientist, Prof. H. Jeffreys. At the same time, he says, his theory accounts for the low average densities of the planets which have caused so much difficulty to astronomers.

As pictured by Prof. Wildt, each of the four giant outer planets has an internal core with a density or specific gravity of 5.5, similar in general to our "home" planet, the earth. Over that is a thick layer of never-thawing ice. Finally, there is a deep outer envelope of gaseous atmosphere, largely hydrogen, though containing also the great quantities of ammonia and methane lately detected in the planetary atmospheres by the American astronomers, Drs. A. Adel and V. M. Slipher.

Prof. Wildt scouts the suggestion, made in some quarters, that these giant planets are still red hot. If they were he points out, the ammonia and methane would be quickly converted into other compounds, since they can not exist as such at red-heat temperatures.

Science News Letter, October 27, 1934

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FROM GALILEO TO COSMIC RAYS—Harvey B. Lemon—*University of Chicago Press,* 450 p., Trade ed. $5.00, with stereoscope; Educational ed. $3.75, stereoscope, 75c. It is an unfortunate situation in college teaching in some cases that a textbook on a given subject is designed to provide information for a student majoring in that subject. Actually the subject is only one of many on a student's schedule. Frequently he becomes lost in a mass of detail. In "From Galileo to Cosmic Rays" this problem in the field of physics is faced squarely. The result is a text with continuity which can be read from cover to cover in a reasonable time. The use of stereophotographs in three dimensions is a novel feature adding interest to the book. Don't ridicule the unorthodox drawings and diagrams. They explain the subject matter, where needed, in a superior fashion. Laymen who haven't looked at a physics textbook since high-school days will want this book and profit by it.

Science News Letter, October 27, 1934

Sociology

THE STRANGER, A STUDY IN SOCIAL RELATIONSHIPS—Margaret Mary Wood—*Columbia Univ. Press,* 295 p., $4.50. How is the stranger received? That depends upon the social group and, in more civilized communities, upon the personality of the stranger himself. The author looks behind the treatment of the stranger in many places and many times for the social relationships responsible.

Science News Letter, October 27, 1934

Economics

NO MORE UNEMPLOYED—John B. Cheadle, H. O. Eaton and C. A. M. Ewing—*University of Oklahoma Press,* 124 p., $1.35. The authors explain that the title was adopted "neither as a promise nor a toast," but to call attention to a major problem. The solution proposed consists of the foundation of an Industrial Stabilization Corporation, with provision for a credit exchange system.

Science News Letter, October 27, 1934

Sociology

THE MIGRATORY WORKER AND FAMILY LIFE—Marion Hathaway—*Univ. of Chicago Press,* 240 p., $1.50. A sociological study of those people who "follow the crops," made in the state of Washington. The family of such migrant workers consists of young and middle-aged adults, native born and literate, accompanied by two or three children. Most of them move from three to five times a year. The workers suffer from inadequate housing, unregulated employment conditions, and exclusion from the workmen's compensation law. The children have no schooling or attend very irregularly. The volume is number 21 of the Social Service Monographs.

Science News Letter, October 27, 1934

Technology

THE PHYSICAL PROPERTIES OF LUMBER—G. F. Ivey—*Southern Publishing Co. (Hickory, N. C.),* 263 p., $2. Price is $2, instead of $1.50 as previously announced in SCIENCE NEWS LETTER.

Science News Letter, October 27, 1934

Astronomy

THE CALCULATION OF THE ORBITS OF ASTEROIDS AND COMETS—Kenneth P. Williams—*Principia Press,* 214 p., $3.25. Textbook for students in mathematics. Prof. Williams believes in the use of calculating machines to take much of the drudgery out of orbit calculations, bringing such problems into the realm of useful student tasks.

Science News Letter, October 27, 1934

Biography—Exploration

MINUTE STORIES OF FAMOUS EXPLORERS—Jerome S. Kates; illustrated by Herbert S. Kates—*Grosset & Dunlap,* 155 p., $1. From Leif Ericsson to Lincoln Ellsworth, 73 explorers parade through this entertaining volume. One page is devoted to each man's career and his picture. Opposite is the map of his travels and drawings of episodes in his career. The book is intended primarily for boys and girls of school age.

Science News Letter, October 27, 1934

Physics

SOUND—Harvey B. Lemon and Hermann I. Schlesinger—*University of Chicago Press,* 39 p., 35c. A guide for use with the educational sound pictures "Sound Waves and Their Sources" and "Fundamentals of Acoustics," prepared for the University of Chicago.

Science News Letter, October 27, 1934

Crystallography

THE CRYSTALLINE STATE, VOL. I: A GENERAL SURVEY—Sir W. H. Bragg and W. L. Bragg—*Macmillan,* 352 p., $5.50. This volume is the 1934 equivalent of the famous Bragg book *X-rays and Crystal Structure* which first appeared in 1914. The subject of crystals and their microstructure has grown so fast that three volumes will be necessary for the completed work. Volume I is a general roundup of the field with emphasis on the gathering of original papers, scattered in many journals, into one book which every reference library will need.

Science News Letter, October 27, 1934

Technology

AUTOMOBILE SERVICE SHOP MANAGEMENT—C. Edward Packer and J. A. Ahlers—*American Technical Society,* 151 p., $1.50. A manual for service managers, shop owners, and mechanics engaged in the management and operation of automobile service stations.

Science News Letter, October 27, 1934

Economics

THE BOOK OF THE MACHINE—*Windsor Press,* 20 p., $4.00. A twenty-page essay, beautifully printed in an edition of 200 copies.

Science News Letter, October 27, 1934

General Science

THE ADVANCE OF SCIENCE—Edited by Watson Davis—*Doubleday, Doran,* 400 p., $3.50. With perfect frankness, we of the staff of Science Service believe that this is a good book, a useful book and a book that everyone should buy. For it is an editorial production of the staff of Science Service. Enthusiastically the publisher says: "A march-of-time picture of all that's new in every branch of science throughout the world."

Science News Letter, October 27, 1934

General Science

YOUR GUIDE TO THE BUFFALO MUSEUM OF SCIENCE—*Pub. by the Museum,* 27 p., 15c. This booklet was listed incorrectly as a free publication, in SCIENCE NEWS LETTER of October 6, 1934.

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